

Report No.: SEWA2310000127RG04

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TEST REPORT

Application No.: SEWA2310000127RG

Applicant: Continental Automotive Systems, Inc.

Address of Applicant: 21440 West Lake Cook, Deer Park, Illinois 60010, USA

Manufacturer: Continental Automotive Systems, Inc.

Address of Manufacturer: 21440 West Lake Cook, Deer Park, Illinois 60010, USA

EUT Description: FE5NAR131
Model No.: FE5NAR131
Trade Mark: Continental

FCC ID: LHJ-FE5NAR131
Standards: 47 CFR Part 2.1091

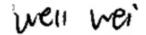
FCC KDB 447498 D01 v06

 Date of Receipt:
 2023/10/24

 Date of Issue:
 2024/01/16

Test Result: PASS*

Authorized Signature:



Well Wei Wireless Laboratory Manager



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^{*} In the configuration tested, the EUT complied with the standards specified above.



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1 Version

Revision Record								
Version	Chapter	Date	Modifier	Remark				
01		2024/01/16		Original				

Prepared By	(Nick Hu) / Test Engineer			
Checked By	(Stone Gu) / Reviewer			



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General Information

2.1 Client Information

Applicant:	Continental Automotive Systems, Inc.
Address of Applicant: 21440 West Lake Cook, Deer Park, Illinois 60010, USA	
Manufacturer:	Continental Automotive Systems, Inc.
Address of Manufacturer:	21440 West Lake Cook, Deer Park, Illinois 60010, USA

2.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC -Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an

accredited testing laboratory. Designation Number: CN1312.

Test Firm Registration Number: 717327





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2.3 General Description of EUT

EUT Description:	FE5NAR131								
Model No.:	FE5NAR131								
Trade Mark:	Continental								
Hardware Version:	P2-1								
Software Version:	MODEMSA515M_I	MODEMSA515M_LE2.1_01.18.52.01							
Power Supply:	DC 14V	DC 14V							
Antenna Type:	⊠External, □Inte	⊠External, □Integrated							
HPUE Power Class:	LTE Band 41; NR B	LTE Band 41; NR Band n77							
	GSM850:	2.56dBi (Ant1)	GSM1900:	1.93dBi (Ant1)					
	WCDMA Band II:	1.93dBi (Ant1)	WCDMA Band IV:	1.93dBi (Ant1)					
	WCDMA Band V:	2.56dBi (Ant1)							
	LTE Band 2:	1.93dBi (Ant1)	LTE Band 4:	1.93dBi (Ant1)					
	LTE Band 5:	2.56dBi (Ant1)	LTE Band 7:	1.24dBi (Ant1)					
	LTE Band 12:	-0.32dBi (Ant1)	LTE Band 13:	-0.32dBi (Ant1)					
	LTE Band 14:	-0.32dBi (Ant1)	LTE Band 17:	-0.32dBi (Ant1)					
Antenna Gain:	LTE Band 25:	1.93dBi (Ant1)	LTE Band 26:	2.56dBi (Ant1)					
	LTE Band 41:	1.24dBi (Ant1)	LTE Band 66:	1.93dBi (Ant1)					
	LTE Band 71:	0.94dBi (Ant1)							
	NR Band n2:	1.93dBi (Ant1)	NR Band n5:	2.56dBi (Ant1)					
	NR Band n25:	1.93dBi (Ant1)	NR Band n41:	1.24dBi (Ant1)					
	NR Band n66:	1.93dBi (Ant1)	NR Band n71:	0.91dBi (Ant1)					
	NR Band n77:	-0.84dBi (Ant2)							
	ENDC:								
	DC_12A_n77A;DC_13A_n77A;DC_14A_n77A;DC_26A_n77A								
	DC_2A_n77A;DC_5A_n77A;DC_7A_n77A;DC_66A_n77A								
	DC_41A_n77A;								
	DC_5A_n2A;DC_1	2A_n2A;DC_13A_n2 <i>A</i>	4						
	DC_14A_n2A;DC_	71A_n2A;DC_7A_n5 <i>A</i>	\;DC_2A_n5A						
	DC_66A_n5A;DC	5A_n41A;DC_12A_n4	11A;DC_26A_n41A						
		/ _5A_n66A;DC_12A_r							
	DC_14A_n66A;DC_71A_n66A;DC_2A_n71A;DC_7A_n71A								
	DC_66A_n71A								



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DC_2A_n41A, DC_4A_n41A, DC_25A_n41A, DC_66A_n41A;

Note:

The antenna gain are derived from the gain information report provided by the manufacturer.

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.



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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

Frequency range (MHz)	Electric field strength (V/m) Magnetic field strength (A/m)		Power density (mW/cm2)	Averaging time (minutes)						
(A) Limits for Occupational/Controlled Exposures										
0.3-3.0 614 1.63 *(100) 6										
3.0-30	1842/f	4.89/f	*(900/f2)	6						
30-300	61.4	0.163	1.0	6						
300-1500	1	1	f/300	6						
1500-100,000	1500-100,000 /		/ 5							
	(B) Limits for General Population/Uncontrolled Exposure									
0.3-1.34	0.3-1.34 614 1.63 *(100) 30									
1.34-30	1.34-30 824/f		*(180/f2)	30						
30-300	30-300 27.5		0.073 0.2							
300-1500	1	/ f/1500		30						
1500-100,000	1	1	1.0	30						

F=frequency in MHz

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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⁼Plane-wave equivalent power density



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3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually

3.1.3 EUT RF Exposure Evaluation

Output Power Into Antenna & RF Exposure Evaluation Distance:

This confirmed that the device comply with MPE limit.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
GSM850	824.2	2.56	33.50	33.91	38.45	0.0968	0.5495	7.10	10.10	7.10	Pass
GSM1900	1850.2	1.93	30.50	32.43	33.00	0.0419	1.0000	2.50	15.70	2.50	Pass
WCDMA Band II	1852.4	1.93	24.00	25.93	33.00	0.0779	1.0000	9.00	13.01	9.00	Pass
WCDMA Band IV	1712.4	1.93	24.00	25.93	30.00	0.0779	1.0000	6.00	13.01	6.00	Pass
WCDMA Band V	826.4	2.56	24.00	24.41	38.45	0.0901	0.5509	16.60	10.42	10.42	Pass
LTE Band 2	1850.7	1.93	24.00	25.93	33.00	0.0779	1.0000	9.00	13.01	9.00	Pass
LTE Band 4	1710.7	1.93	24.00	25.93	30.00	0.0779	1.0000	6.00	13.01	6.00	Pass
LTE Band 5	824.7	2.56	24.00	24.41	38.45	0.0901	0.5498	16.60	10.41	10.41	Pass
LTE Band 7	2502.5	1.24	24.00	25.24	33.00	0.0665	1.0000	9.00	13.01	9.00	Pass
LTE Band 12	699.7	-0.32	24.00	21.53	34.77	0.0464	0.4665	12.92	9.70	9.70	Pass
LTE Band 13	779.5	-0.32	24.00	21.53	34.77	0.0464	0.5197	12.92	10.16	10.16	Pass
LTE Band 14	790.5	-0.32	24.00	21.53	34.77	0.0464	0.5270	12.92	10.23	10.23	Pass
LTE Band 17	706.5	-0.32	24.00	21.53	34.77	0.0464	0.4710	12.92	9.74	9.74	Pass
LTE Band 25	1850.7	1.93	24.00	25.93	33.00	0.0779	1.0000	9.00	13.01	9.00	Pass
LTE Band 26 (814-824)	814.7	2.56	24.00	NA	NA	0.0901	0.5431	NA	10.36	10.36	Pass
LTE Band 26 (824-849)	824.7	2.56	24.00	24.41	38.45	0.0901	0.5498	16.60	10.41	10.41	Pass
LTE Band 41	2498.5	1.24	24.00	25.24	33.00	0.0665	1.0000	9.00	13.01	9.00	Pass
LTE Band 41(HPUE)	2498.5	1.24	27.00	28.24	33.00	0.1327	1.0000	6.00	10.01	6.00	Pass
LTE Band 66	1710.7	1.93	24.00	25.93	30.00	0.0779	1.0000	6.00	13.01	6.00	Pass
LTE Band 71	665.5	0.94	24.00	22.79	34.77	0.0620	0.4437	12.92	9.48	9.48	Pass
NR Band n2	1852.5	1.93	24.00	25.93	33.00	0.0779	1.0000	9.00	13.01	9.00	Pass
NR Band n5	826.5	2.56	24.00	24.41	38.45	0.0901	0.5510	16.60	10.42	10.42	Pass
NR Band n25	1852.5	1.93	24.00	25.93	33.00	0.0779	1.0000	9.00	13.01	9.00	Pass
NR Band n41	2506.0	1.24	24.00	25.24	33.00	0.0665	1.0000	9.00	13.01	9.00	Pass
NR Band n66	1712.5	1.93	24.00	25.93	30.00	0.0779	1.0000	6.00	13.01	6.00	Pass
NR Band n71	665.5	0.91	24.00	22.76	34.77	0.0616	0.4437	12.92	9.48	9.48	Pass
NR Band n77 (3450-3550)	3460.0	-0.84	24.00	23.16	30.00	0.0412	1.0000	6.00	13.01	6.00	Pass
NR Band n77 (3450-3550)(HPUE)	3460.0	-0.84	27.00	26.16	30.00	0.0822	1.0000	3.00	10.01	3.00	Pass
NR Band n77 (3700-3980)	3710.0	-0.84	24.00	23.16	30.00	0.0412	1.0000	6.00	13.01	6.00	Pass
NR Band n77 (3700-3980)(HPUE)	3710.0	-0.84	27.00	26.16	30.00	0.0822	1.0000	3.00	10.01	3.00	Pass



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Remark: Frame-average power=Burst power+ Division Factors (-9.19)

Due to the EUT support NR ENDC and CA

$$\sum_{i=1}^{n} \frac{S_{E_{i}}(dutyfactor)}{MPE_{E_{i}}} < 1$$

Both LTE and NR/LTE band can transmit simultaneously, the formula of the calculated the MPE is: NOTE The corresponding MEs must be expressed in terms of power density in the above summation Therefore, the worst-case(DC_26A_n41A) situation is 0.1659+0.0665=0.2324, which is less than "1", this confirmed that the device comply with MPE limit.

---End of Report---

